

Abstract of the Disclosure

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A mobile robot base movable relative to a surface, comprising: at least two wheels pivotably and rotatably mounted to the base, each wheel having a steering axis and a rotation axis; drive means for rotating the wheels along the surface; steering means for pivoting the wheels with respect to the surface; and controller means for controlling the motion of the base, wherein the controller means includes means for reading an input motion vector from a host processor, mapping the input vector to a desired axis motion vector for each of the axes (Fig. 3), calculating a control envelope for each of the axes, determining whether the axis motion vector lies within the control envelope for each of the axes (Fig. 3), calculating a modified axis motion vector when the axis motion vector does not lie within the control envelope (Fig. 3), sending the axis motion vector or modified axis motion vector to an axis controller for each of the axes (Fig. 3), estimating a motion of the base traveled during a discrete time interval Δt (Fig. 3), calculating a position and an orientation of the base in a set of world coordinates (Fig. 3), and repeating the previous steps continuously until commanded to stop (Fig. 3). Other aspects include a holonomic base capable of instantaneous movement in any direction without reconfiguring the wheel headings, regardless of the configuration of the wheels. Also, a method of using forces and torques to control the base, and to compensate for undesired motions of the base due to dynamic effects of the wheel motions is disclosed.